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ABSTRACT

Science and aesthetics are not separate disciplines but rather are, or should be, cohesive parts which only together form the best and proper approach to academic study. The humanistic study of the information sciences--with speech communication as the core--must unify its present emphasis on the scientific with greater concern for the aesthetic. In such studies consideration of the aesthetic stresses abstractions and illusions, time-bound and enduring values, and polymorphic forms of expression of these values and ideas. Aesthetic works and their modes of expression must be joined with scientific concerns in academic studies of communication and expression, since both pursuits are essentially communicative and expressive. (CH)

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SCIENCE WITHOUT AESTHETICS

International Communication
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The title of a paper is like a title to real estate. The title gives the owner a right to dwell on a piece of property, to make additions and improvements on the property, within the zoning code, and the right to call the property his own. Before buying property it is necessary to make a title search and if this piece of property were thrown into escrow to find former tenants it would be discovered that among the former tenants were such people as Karl Popper, DeWitt Parker, Bentley Glass, Bernard Berelson and Gary Steiner. From these tenants I have drawn some of my tenets. The mineral rights on this piece of property are not reserved and anyone who wishes to dig around and explore beneath the surface has my permission.

CS 500 381

Beneath every statement there are levels of assumption that should be examined before dealing with the statement. The title of this paper "Science Without Aesthetics" is loaded with assumptions. First there is an assumption that science is somehow combined with aesthetics. There are some who would not accept this basic assumption, regarding science and aesthetics as being two ends of a continum or as opposites. A second inference that could be made from the statement might be that both science and aesthetics are so inter-related that one without the other is weakened and that the two must operate together.

Since the most probable connection between the readers or hearers of this message and myself is a mutual interest in speech and communication I would like to deal with a practical "hangup" that some of us seem to have. We, as teachers and researchers, like to think of ourselves as being scientific in our approaches to speech communication. Being a part of the academic culture rather forces us to gain respectability by being a part of the social sciences. However, since communication does involve personal expression we are also forced to be concerned with aesthetics. We are not in a dilemma, however, since it is not really an either or situation. We do become factional in approaching the problem and regard those who are in certain areas of speech communication, such as oral interpretation, theatre, storytelling and public speaking as being a little more on the aesthetic side with communication theory, voice sciences, audiology and speech pathology as being more scientific.

The natural place to begin a study of the humanization of the information sciences is with the definition of speech communication as a science/art. The emphasis on scienctific aspects of communication is quite dominant in examining the study and research in the field and the emphasis on the aesthetics of communication is meager and almost completely lacking in research.

In writing this paper my primary purpose is to show what happens when aesthetics is ignored in the information sciences. Since aesthetics is so often ignored by the scientists it may be necessary to establish some general definitions and philosophical assumptions that undergird the study of aesthetics. Science and aesthetics will not be dealt with in a polemic fashion since it is assumed that both approaches exist and there is a common denominater - the nature of human beings being human that should hold the two approaches together. My purpose is to point to the contributions aesthetics can and does make to the study of speech communication and the information sciences. It should be assumed at the outset that aesthetics, though a part of philosophy and concerned with emotional responses and attitudes, is also information in the communication process. Methods of dealing with the information as presented from the aesthetic base is different from science and does not lend itself to the same methods commonly employed in scientific research.

In this paper aesthetics will be regarded as a branch of philosophy and as an evaluative discipline dealing with emotions and feelings and attitudes related to the communicative science/arts. As a philosophical study it should be assumed that the philosopher begins to ask questions at the point where everyone else stops. The approach in this investigation will be as objective as possible.

By the very nature of aesthetics there is an avoidance of strict objective stereotypes and the use of what Ruth Saw calls "...the disappearance of tolerance." (Saw, Ruth, Aesthetics, N.Y. Anchor Books, 1971.). In discussing aesthetics there are three basic approaches to objectivity in the arts; first, the technical analysis of the art itself without regard to the communication in whatever the art object may be, secondly, the appreciative approach of both the sender/receiver and the receiver/sender in the communication implicit in the artistic communication, and thirdly, the intentional approach to art in which the "feed-forward" of the artist may become of greater importance than the "feedback" of the receiver/sender. Since oral interpretation represents to me one of the most important areas of concern in aesthetics and communication I will be centering my attention on this important communication discipline. Oral interpretation can be a common denominator for those interested in communication and information sciences and for those interested in the aesthetics of the science/art of communication.

In scientific research objectivity is paramount. Karl Popper in The Open Society and Its Enemies (London, Routledge and Kegan Paul, 1952, p. 238.) delecped the thesis that scientific objectivity is the result of free criticism and cooperation by many scientists. There are two different aspects to scientific objectivity, the private and public and the scientist does not achieve the private by making a claim on some area of research. Rather, after other scientists have carefully examined the research, testing the hypothesis and the research methods in an exhuastive fashion, then often that bit of research or scientific law is named for the discoverer with his name as an acolade, such as Newton's law and Heisenberg's principle.

The bases of scientific objectivity - personal disinterestedness, free criticism among scientists, and the striving toward mutual understanding - are not devoid of intense personal involvement but are a part of the "rules of the game". All science is a team effort, with both collegues and opposition. Who wins and who loses is not as important as the results that emerge through the playing of the game.

Art and artistic expression is often less of a team effort and the rules of the game are more nebulous. The artist expresses himself subjectively and his work is not duplicated by others to test his methods of expression. Every scientific discovery is researched and repeated by other scientists as a means of verification. Artistic expression is unique and completely individualistic and guarded against duplication by law, even to the extent of having to pay the author for the duplication of his words when used in a published or reproduced paper such as this one, even though we all try to avoid such tedious matters.

To understand the nature of science without aesthetics it is mandatory to grasp some of the basic characteristics of both science and art. I would not presume to attempt a complete explication of the two in such a short presentation as this paper affords. Therefore, I must assume some basic understanding on the part of the reader and make some cogent generalizations and some specific comparisions.

One of the most obvious differences between aesthetics and science, as reflected in the writings of the metascientists and the metaaestheticians is the question of values. After considerable reading and thinking I am convinced that those who contend that science is less concerned with values than those who are in the arts, such as DeWitt Parker, are in error. (Parker, DeWitt, The Principles of Aesthetics, NY, F.S. Crofts & Co., 1946).

The primary differences regarding the place of values is not a rejection of values on the part of science, but a different sense of values. Science values objectivity and rigorous research in the search for truth as related to "reality". Reality is determined by the research done in the search for reality and evaluated by the methods used in scientific inquirey. Art is less concerned with scientific reality and more subjective in methodology. The value system of science tends to exclude the observer in an attempt to achieve objectivity that will not vitiate the experiment and in aesthetic endeavors the creater and the observer become a part of the art object itself.

To provide a basic pattern of evaluation in an attempt to elucidate the nature of science without aesthetics and aesthetics without science let us compare the main features of science with the main features of aesthetics and the arts.

SCIENCE	AESTHETICS
1. Scientific knowledge is primarily based on facts and testable information.	1. Aesthetic knowledge is much less concerned with factual information and is more concerned with abstractions and the creation of illusions.
2. Science goes beyond the facts by hypothesizing and does not accept information unless it has been tested. When new facts are discovered the old information is discarded. Scientific discovers are non-additive and each new discovery of importance alters the other areas of knowledge.	2. Aesthetic knowledge includes an appreciation of past and out dated "facts". Enduring old art objects are cherished and not rejected in aesthetics. Time binding is more common to art and aesthetics than to science. The new art is often regarded as on trial - judged by the aesthetic of historical criticism. Some art critics regard time as a criteria for determining the aesthetic quality of an art object.

3. The methods of science are analytical. Appreciation is more restricted to the method of scientific research as a discipline rather than an appreciation of the object of scientific discovery. Both analysis and appreciation are functions of science and aesthetics, but there are differences in the procedures used.

4. Science is highly specialized in research areas and in methodology. Greater training is necessary for scientific work than for art. There seem to be but few natural scientists as compared to "natural artists"

5. Scientific knowledge and information is expressed in a clear, concise and formal language. Mathematics and scientific formulas serve as a universal language for science.

3. The methods of aesthetics are primarily appreciative in nature and analysis is often discouraged. Appreciation is often based on the art object itself and the intention of the artist rather than an analysis of the technical aspects of the art. In aesthetics, appreciation preceded analysis and in science analysis usually precedes appreciation.

4. Art, as a profession is less specialized, and there seem to be people without specialized training who can produce works of art.

5. Aesthetics has many different languages or means of expression and, especially in poetry, there is more use of ambiguity than clear direct discourse. Each art form has a different means of expression.

6. The audience for scientific communication of information is primarily fellow scientists and secondardly society in general. Communication with the public is more difficult for the scientist than for the artist due to a general lack of knowledge and understanding by the general public.

6. Artists more often communicate with a much wider popular audience first and then with fellow artists. The impact of artistic communication is more immediate and often spontaneous in nature than communication of scientific information.

7. Scientific knowledge is usually verifiable and tested by the controlled replication of the procedures used to secure the information. Scientific knowledge can be used by the artist to produce art objects and artistic knowledge can be utilized by the scientist in the conceptualization and creation of original ideas and hypotheses. Leonardo da Vinci as an artist, created fantastic sketches of scientific devices for flight - unfortunately the machines did not work.

7. Aesthetic knowledge is less verifiable and due to the creative nature of art there is little replication or duplication. Wide spread duplication of an art object tends to lessen the value of the art object.

8. Scientific methods are more restrictive than the methods or art and on the whole science seems to be more methodical than art.

8. The methods of art are more available to the common man since less sophisticated equiptment is need for art than for science. Art that is created following some set methodical procedure is often inferior to art that is created with less attention to the method of creation and with more attention to the art object itself.

9. Science is often dependent upon cooperation and team work among fellow sceintists and art is more often the work of a solitary individual.

9. Very few artists, unless engaged on a big project, work as a team in creating their art. Poems are not written by teams or committees and on the whole the artist leads a solitary life while in the process of cre. ion.
Both art and science are lonely professions and solitude is required by people in both professions.

10. The basis of science is explanation and prediction.

10. Art is less concerned with explanation and is primarily expressive in communication. Art is also less predictable, being conditioned by the general acceptance of s dynamic shanging social situation.

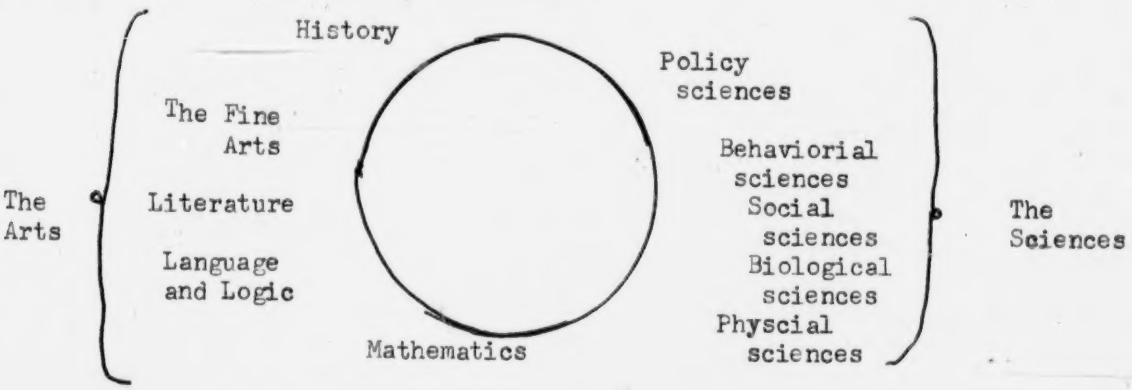
11. Science is often judged on a criterion of usefullness to society. There are more practical applications of the products of science than those of art.

11. The practical uses of art are usually of less concern than the aesthetic aspects. To the builder, the wall has a practical use and to the artist the wall may be viewed aesthetically.

The above are a partial listing of the basic nature of both science and aesthetics, pointing out the differences and the similarities. It is quite evident that there are differences, yet these differences are not so great that it should be assumed that the differences makes it possible for a esthetics and science to operate alone as effectively as the two can function together. What holds science and aesthetics together is the common concern for the whole nature of man as a human being. Each deals with the nature of man, one in dealing with the practical needs, as in the case of science, and the other, aesthetics going beyond the immediate practical needs to fullfill the needs that man as a disctinctive creature seems to need to exist as a human being.

The other common concern of both science and aesthetics is for freedom to exist in society without outside controls that are destructive. A control over the free pursuit of science or art is a control over the basic nature of man as a scientific being and as an artist and both science and art should be united in their efforts to assist mankind in the fullest development of the human potential.

Science and aesthetics are related in a rather comprehensive manner in the following schematic diagram :



The placement of the arts and the sciences in the above diagram does not infer that the two are in opposition to each other, but that there is a realtionship or continium between the two. In the expression of both art and science they share abstraction for a common denominater as a means of expression. The methods of communication are similiar in many ways, though the methods and the philosophy of the artist and the scientist differ.

Aesthetics and science are not so inter-related that one can not function without the other, but together art and science are mutually augmented and strengthened. Each needs the vital freedom to work within the commonly accepted framework of the distinctive methodology and discipline of aesthetics and science without external restrictions.

Art and science are related to each other through the fundamental needs that each has in holding and expanding their basic freedoms. The need for freedom in science is similiar to the need for freedom in the arts. Bentley Glass in Science and Ethical Values (Chapel Hill, Univ. of North Carolina Press, 1965) outlined some commandments for scientists as follows;

> The first commandment in the ethical basis of science is complete truthfulness, and second is like unto it: Thou shalt not covet thy neighbor's ideas not steal his experiments.
> The third is fearlessness in the defense of intellectual freedom, for science can not prosper where there is restraint on daring thinking. p. 90

I suggest that these same commandments could be basic for aesthetics and the arts, plus another commandment presented by Glass that the results of works of science and art should be shared with others. Any attack upon intellectual freedom, whether directed toward the arts or science, should cause the two most vital areas of human soncern to unite to fight those who are opposed to intellectual freedom.

The methods and styles of communication in the arts ffer a viable means of defense for science and in turn science offers aesthetics tools and means of defense. One without the other is weakened when either area is under attack. Consider the attack made on science in the following statement;

> Science is a social phenomenon, and like every other social phenomenon is limited by the injury or benefit it confers on the community...the idea of free and unfettered science is absurd.

Before revealing the source of the above statement, I would like to point to the danger that exists when those who control society in general or more specifically, the society of scholars, determine what injury or benefit science and art can do to and for society. "He who controls the purse strings controls the organization" is a cliche that is meaningful and science - being more expensive than art probably suffers from such controls more than art. The above statement was made by Adolph Hitler. (Rauschning, H., Hitler Speaks, London, Butterworth, 1939. p. 220.)

Freedom, when under attack from those who would seek to control society, is indivisible. The loss of freedom of expression in the arts is precursive to possible losses of freedom in scientific endeavours. The loss of freedom by an individual is a threat to society as a whole. Therefore, science and art should unite when the freedom of one is attacked since the most important condition for work in science and in the arts is freedom.

In the fight for freedom the arts can often provide the tools and the weapons needed by science. It is more than an suumption to say that the artist is more in touch with society in general than is the scientist since the scientist is not only more bounded by his discipline, but is less articulate (handicapped by the technical aspects of communicating his work to the lay person) and unskilled in the over all tasks of communication with the general public. The artist has more methods and means of expression, drama, literature, painting, and the art of dialectic than does the scientist. The techniques of art are more subtle, especially the use of satire, and can be used in ways that are more effective in the communication process. The artist, when dealing with serious problems in a satirical way, can not only present an attack on those who offer a threat to the freedom of science and the arts, but can also united through his art those who are under attack. (Martineau, William "A Model of the Social Funsctions of Humor" in The Psychology of Humor, edited by Goldstein, Jeffrey H. and Paul E. McGhee, NY, Academic Press, 1972, p. 119.)

Science without aesthetics is weaken at the very point where science should be strong. The benefits of science to humanity must inculde the assistance that science can give to the full development of man as a creature that not only thinks and responds to his environment as a creature but as a creator. Science without the vital spark of imagination and creativity that is the prime factor in the arts and aesthetics tends to become dull and routine. The difference between the true scientist and the technician can be ascertained by some measure of the creativity of the individual.

There are certain qualities that are fundamental to the act of creation whether in the sciences or in the arts. Creativity can not be forced into operation by regimentation or command. The "think tanks" provide the creative person with some of what is essential; time and freedom and a sense of leisure that opens the way for whatever creativity may take place. The external enviroment is not as important as the intrinsic qualities needed for creation; sensitivity, imagination and the ability to function on a plane of intuition or the super-conscious. While aptitude and training are necessary for creative thinking, the qualities of mind for both scientific creativity and artistic creativity are more similiar than different.

Sensitivity is the the artist or scientist what the delicate lens is to the camera. It is the means of seeing what is beyond the powers of the human eye. The probings of the microscope or the telescope must be interpreted by the viewer and what can be perceived through the lens is dependent upon the sensitivity, the imagination and the ability to make the intuitive leap by the creative person.

To explain what I see as the nature of science without aesthetics I would like to use an illustration found in Harold G. Cassidy's book, The Sciences and the Arts, A New Alliance, (NY, Harper & Brothers, 1962, p.6.). Cassidy defines an artist as a person who produces a work of art and a scientist as a person who produces a scientific work. He presents two similiar examples of such works.

The Poet

When to the new eyes of thee
All things by immortal power
Near or far,
Hiddenly
To each other linked are
That thou canst not stir a flower
Without troubling of a star.

The Scientist

$$F_{gravit.} \propto \frac{m_1 \ m_2}{S^2}$$

The two works, a part of a poem by Francis Thompson and the formula by Sir Isaac Newton, both deal with the relation of earth to the stars, both are creative communications and the main difference is in the methodology and the form of expression. I will grant that I, with more poetic inclinations than scientific understanding, can more easily understand the poem than the formula, and I assume that there are some people that would more easily grasp the formula than the poem.

Either of the two works could be used as analogues for a comparision or an illustration. In the work I have done with Elwood Murray in the development of the Interdisciplinary Analogue Laboratory (reported in previous ICA conferences), we have discovered that analogies from science and the arts seem to compliment each other and that students versed in the arts often find new insights when confronted with analogies from the sciences and vice versa.

For example, consider the situation where an artist and a scientist are both examining an artifact such as a piece of pottery in a museum. The artist may take an aesthetic view of the object and in his imagination infer the whole from the fragment. He would be interested in the artistic expression he feels present in the craftsmanship of the creator, the sense of unity and the expression on the surface of the fragment. The scientist would be more interested in making an analysis of the fragment to determine the date, the probable location of the materials used in making the jar, the general structure of the implement and the possible uses to which it had been put. All this information could be obtained by the methods of science. The value, as seen by the scientist, would be in the scientific approach and analysis of the object. The value, as felt by the artist, would be in the general nature of the art object and the artistic inferences that could be made from a study of the artifact.

Consider the moon, once the province of the artist and an unobtainable object of romantic interest as well (when used as a word) as a handy rime for June, tune and croon by the versifier. Now the scientific approach enables the science oriented people to make scientific investigations of far reaching significance in attempts to gain better understanding of the universe. The values of the moon, calculated now in billions of dollars, has not changed due to the preemption of science. The artist is still free to find values in the moon as a romantic apostrophe. The values as seen by the scientists are not in opposition to the aesthetic values - it is merely a different sense of values as perceived by the artist and the scientist.

The most fundamental difference between science and aesthetics is centered around the problems of dealing with "reality and illusions". Science is, of course, more concerned with reality, the testing and measurement of what exists, the exploration of the physcial nature to discover new realities, Aesthetics is essentially concerned with illusions that are meaningful to man, the creation of what is beyond the measureable reality and the development of those necessary, limited and hopefully creative illusions, which makes man more than another animal.

In a way this is the focal conclict between science and aesthetics. I am reminded of the line in Henrik Ibsen's play The Wild Duck, spoken by Dr. Relling to your Gregers who was trying to force the family to confront reality, "Relling said, "Never rob a man of his illusions, that's what he lives by." It is not that scienceseeks to destroy men by robbing them of the illusions they find so necessary, but that science regards illusions as being of no great value. Aesthetics on the other hand does not attack reality and try to substitute illusion, but rather the arts place far greater values on the creation of those necessary, limited and creative illusions that men seem to need.

Perhaps the best defense of the place of illusions in life comes from the following statement at the end of the book Human Behavior, An Inventory of Findings by Bernard Berelson and Gary Steiner (NY. Harcourt,Brace and World, Inc. 1964, 641)

The artists are speaking out in defense of man, especially the literary artists. Consider, for instance, what the most popular books for college and high school students are saying. The four most popular books for young people today are those of Hesse, Tolkien, Vonnegut and Brautigan. All four authors can be classified as fantasy writers, using fantasy to comment on reality. The reality behind their fantasy is grim, for instance, the bombing of Dresden in Vonnegut's Slaughter House Five and Brautigan's story of the tigers in Troutfishing in America. All four authors provide the reader with alternatives to the present realityand the overall direction in the writing of these men is in the quest for selfhood and self definition.

Perhaps the major aestheic contribution of these four popular writers of the seventies, other than the fine literature, is the emphasis they place on the affirmative sense of the possibilites of the human spirit. There is no facile optomism in these books, but an acceptance of the reality that surrounds the characters and a persistent search for values within self. Edwin Casebeer in Herman Hesse (NY: Paperback Library, 1972 p. 14) states, "In this time of disillusionment and danger we need writers like Hesse, Tolkien, Vonnegut and Braitigan - to remind us that joy is still possible, to teach us (in Hesse's phrase) how to hear the laughter of the immortals."

There is a certain irony in the fact that what college and high school students are reading in these four major most popular authors is being read outside the formal educational structure. Perhaps the reason for this failure to deal with the most popular literature now being read by college students is the preoccupation of the academic community with science rather than a concern for what seems to hold artistic delight for our students.

Summary:

Science and aesthetics as areas of study can and do exist apart, but when the two are combined they are stronger since both are concerned with the improvement of society and the enhancement of the nature of man. The approaches of aesthetics are more philosophical and subjective while the approaches of science are more rigourously controlled and far more objective. Artistic endeavors are more often the results of a single solitary individual working alone while science is more of a team or proup effort. Art is more dependent upon public reaction and response than scientific work and in the communication process works of art are presented to the general public directly while for the most part the works of science are carefully checked analyzed and studied by fellow researchers before presentation to the general public.

Aesthetics and science share some common approaches and charteristics, being quite similiar in the creative aspects and concern for values unique to each. The primary differences between art and science in the approaches are the greater concern of science for verifiable information, the analytic method of science and the appreciative nature of aesthetics, the need for ambiguity and illusions in the production of aesthetic objects and the precision and scientific truths of a laboratory method in the sciences, and the differences in the communication of the results of both science and art.

The most vital common concern of science and aesthetics is with freedom. It is here that science without aesthetics is most vulnerable and weak. Together science and aesthetics must fight for the right to unhampered research and expression and art offers to science some unique weapons to carry on the battle. When freedom is attacked by those forces which seek to control and dominate society for selfish ends it is imperative that both science and art unite and form a common defense for mutual protection and to protect the forces that can advance changes and opportunity that can improve the condition of mankind in general and in specific ways. Science and aethistics - two views of the nature of man - united to provide opportunity for complete scientific and aesthetic development of human beings must work together.

For a balanced development of the human being both science and art serve as a check and balance system. There are times, viewed historically, when the contributions of science seem to be of greater importance and value than the contributions of art, the "Age of Science" and the "Age of Art" are common chapter headings in histories of man and yet one does not exist without the other and both art and science are constant parts in the histrical development of man. Science asks, what and how and art asks why. Each advance of science opens Pandora's box, but it is art that describes the the furies and the evils that flew out of the box. There is one aspect of the mythical story of Pandora's box that is very apropos in a stuyd of science and art. When Pandora, made of clay by orders from Zeus to counteract the gift of fire given to man by Prometheus, brought to mankind her jar containing all manner of evils

troubles and diseases, as yet unknown to man, there were also virtues hidden in the jar under the evils. When the box or jar was opened the furies and the evils flew out - but Pandora was able to close the box before all that was in it escaped. The only virtue that was still contained in the box was Hope.

There is still hope for man, not only in the mythical story of Pandora's box, but hope than all the evils, troubles and diseases that escaped can be dealt with by science and that man through both art and science will achieve the greatest possible human potential. (Dictionary of Classical Antiquities, Oscar Seyffert, editor, Meridian Library, p. 520). If hope is lost for the development of man in the classical battle for equality with the gods as reflected in so many of the myths of the Greeks, then all is lost. Art is based on hope, as is science, hope for the future and for the fullest possible development of the human potential. There are virtues and values in mankind that are as yet beyond our present knowledge. Edward W. Hall in Modern Science and Human Values, (NY, D. Van Nostrand Co., 1956, p. 475) closes his book with these words;

> Western man today has achieved an exceedingly powerfull tool for discovering facts and factual laws. He has done this by ridding himself, in this procedure, of value thinking... if he can cling to the conviction that there are values in the world until he can work out a reliable technique for discovering them concretely, he may survive.

Science without aesthetics may mean that the human is being diminished, rendered into a machine which can be analyzed, repaired and even created by science. Science has added great technological information to our world, but the blessings of brought to us by science have also been curses. Technological advances have been responsible for the pollution of the land, the water and the air. Television and jet transport have contracted and compress the world. Men today live closer together yet we seem to exist further apart as human beings. Life seems to have become mechanical rather than spontaneous in nature. As René Dubos expressed it in So Human an Animal (NY; Charles Scribner's Sons, 1968, p. 146):

> If scientists elect to study man only by physicochemical methods, they will discover on the physicochemical determinants of his life and find that his body is a machinery of atoms. But they will overlook other human characteristics that are at least as interesting and important. One of them is that man hardly ever reacts passively to external forces. The most characteristic aspect of his behavior is that he responds not only actively but often unexpectedly and creatively. He is the more human the more vigorously he converts passive reactions into creative responses. The mechanical definition of human life misses the point because what is human in man is precisely that which is not mechanical.

Without aesthetics and art man can be mechanized and dehumanized and the artist must fight for the wholeness of man as he sees him. The fight is not against science, but for a picture of man as he is and can become. Man does not live by bread, and disposals and jets and computers alone. Life is a combination of hyacints and bisquits. The road to hell is paved with good inventions.

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BIBLIOGRAPHY

Aslin, Elizabeth. The Aesthetic Movement. (New York: Praeger, 1969).

Barleant, Harold. The Aesthetic Field. (Springfield, Ill.: Thomas, 1970).

Berelson, Bernard and Gary Steiner. Human Behavior, An Inventory. (New York: Harcourt, Brace & World, 1964).

Berlyne, D., Aesthetics and Psycho-biology. (New York, Appleton Century, 1971).

Brillouin, Leon, Science and Information Theory. (New York: Academic Press, 1962).

Bronowski, Jacob, Science and Human Values, (New York: Harper, 1965).

Burhoe, Ralph (Ed.). Science and Human Values in 21st Century. (Philadelphia. Westminster, 1971).

Carver, George Alexander, Aesthetics and the Problem of Meaning. (New Haven. Yale, 1952).

Casebeer, Edwin, Harmon Hesse, (New York: Paperback Library, 1972).

Cassidy, Harold G., The Science and the Arts, A New Alliance. (New York: Harper & Brothers, 1962).

Conant, James Bryant, Science and Common Sense. (New Haven: Yale University, 1951).

Dingle, Herbert, Science and Human Experience, (London: Williams and Northgate, 1931).

Dubos, René, So Human An Animal, (New York: Charles Scribners, 1965).

Glass, Hiram Bentley, Science and Ethical Values. (Chapel Hill: University of North Carolina, 1965).

Goldstein, J. and Paul McGhee (Ed.). The Psychology of Humor. (New York: Academic Press, 1972).

Hall, Edward W., Modern Science and Human Values. (New York: D. Van Nostrand Co., 1956).

Hesse, Mary B., Science and the Human Imagination. (New York: Philosophical Library, 1955).

Kahn, Sholom Jacob. Science and Aesthetic Judgement, (New York: Columbia University Press, 1953).

Maeron, Charles, Aesthetics and Psychology, (London: Hogarth, 1935).

Michelson, Peter, The Aesthetics of Pornography. (New York: Herder & Herder, 1971).

Mueller, Robert, The Science of Art. (New York: John Day, 1967).

Mukařovský, Jan, Aesthetic Function, Norm and Value as Social Facts, (Ann Arbor: University of Michigan, 1970).

Nahm, Milton Charles, Aesthetic Experience and Its Presupposition (New York: Harper, 1946).

Osborne, Harold, Aesthetics and the Modern World, (New York: Weybright & Talley, 1965).

Parker, Dewitt, The Principles of Aesthetics, (New York: F. S. Crofts & Co., 1946).

Philipson, Morris, Aesthetics Today, (Cleveland: World Publishing Co., 1961).

Popper, Karl, The Open Society and Its Enemies, (London: Routledge & Kegan Publishers, 1952).

Prall, David Wright, Aesthetic Analysis, (New York: Crowell, 1936).

Rauschning, H., Hitler Speaks, (London: Butterworth, 1939).

Richards, Ivor Armstrong, Science and Poetry, (London: Trench, Trubner & Co., 1926).

Saw, Ruth, Aesthetics, (New York: Anchor Books, 1971).

Seyffert, Oscar, Dictionary of Classical Antiquity, (New York: Meridian Library, 1962).

Shoemaker, Francis, Aesthetic Experience and the Humanities, (New York: Columbia, 1943).

Smith, Ralph, Aesthetic Concepts and Education, (Urbana: Illinois University, 1970).

Weaver, Warren, Science and Imagination, (New York: Basic Books, 1967).